

**Abstract of the Disclosure**

An Orthogonal Frequency Division Multiplexing (OFDM) transmission utilizes random phases across the OFDM sub-carrier components and differential encoding so that the phase information (i.e., phase values) does not have to be explicitly transmitted to a receiver. The OFDM data symbols are differentially encoded so that the phase information on the symbols that are multiplied together in the differential encoder is the same. Assuming use of a differential phase shift keying (DPSK) system, a phase sequence is used having “ $V$ ” random phase values, where  $\theta_{n,k}$  is the phase value in the  $n^{\text{th}}$  sub-carrier in the  $k^{\text{th}}$  OFDM symbol and is periodic in  $n$  with  $V$  as the period. A current input symbol is then differentially encoded relative to the  $V^{\text{th}}$  previous encoded output from the encoder so that the phase values on the symbols multiplied together in the differential encoding process are the same.